REMARKS

This is in response to the Office Action mailed on July 16, 2010 in which claims 3-5, 7, 9, 12-14, 18, 24-26 and 30-33 were rejected under 35 U.S.C. §§ 103(a). In reliance on the following remarks, the present application with pending claims 3-14, 18, 24-26, and 30-33 is in condition for allowance, and reconsideration and notice to that effect are respectfully requested.

Overview of the Present Invention

According to the present invention, a fire and explosion suppression system delivers a two-phase mixture of a liquid and a gas (liquid mist droplets carried by the gas) to a space where a fire or explosion is to be suppressed. The droplet size distribution in the mist is controlled by adjusting the ratio of mass flow rate of the liquid (M_w) and mass flow rate of the gas (M_g). Droplet size distribution can be kept constant throughout discharge by using the gas to pressurize the liquid to keep a constant M_w/M_g ratio. As the pressure of the gas (and thereby the M_g) is reduced within the system, the M_w is also reduced as there is less pressure to cause liquid flow. Since the gas is used to pressurize the liquid, the M_w/M_g ratio is maintained at a constant level. By keeping the M_w/M_g ratio constant, a reduction in droplet size distribution that is observed in other systems is avoided.

Rejection of Claims 3-5, 7, 9, 12-14, 18, 24-26 and 30-33 under 35 U.S.C. § 103(a)

In the Office Action, claims 3-5, 7, 9, 12-14, 18, 24-26 and 30-33 were rejected under 35 U.S.C. §103(a) as being unpatentable over PCT International Application No. WO 95/24274 ("Terpigorjev") in view of PCT International Application No. WO 00/75741 using U.S. Patent No. 6,935,362 ("Yonnet") as a reference. Section 706.02(j) of the MPEP provides:

> To support the conclusion that the claimed invention is directed to obvious subject matter, either the references must expressly or impliedly suggest the claimed invention or the examiner must present a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references.

Ex parte Clapp, 227 USPQ 972, 973 (Bd. Pat. App. & Inter. 1985).

Terpigorjev generally describes providing atomized liquid droplets by subjecting a gas/liquid mixture (GLM) to an acoustic field. The nozzle of Terpigorjev includes a resonance chamber in which energy of the GLM is converted into acoustic radiation energy and applied to the GLM flowing out of the nozzle's outlet holes. Yonnet generally describes a pilot valve.

The Office Action correctly noted that Terpigorjev does not teach all the limitations of the independent claims. With regard to independent claim 4, the Office Action conceded that Terpigorjev does not teach the limitation requiring means in the first path for automatically adjusting the mass flow rate of the liquid extinguishing agent as a function of the applied pressure of the pressurized gas so as to control the ratio of the mass flow rate of the liquid extinguishing agent in the first path to the mass flow rate of the pressurized gas in the second path towards such a value as to tend to produce a constant droplet size distribution in and for substantially the duration of the discharge. In view of this deficiency, the Office Action asserted that it would have been obvious to one of ordinary skill in the art to add the control valve of Yonnet to the apparatus described by Terpigorjev, and to locate it in the first path and have its control port be connected to the second path to allow the flow of the fluid in the first path to be dependent on the pressure of the fluid in the second path. With regard to independent claim 5, the Office Action asserted that it would have been obvious to one of ordinary skill in the art to add the control valve of Yonnet to the first path in Terpigorjev and have its control port be connected to the third path to allow the flow of the fluid in the first path to be dependent on the pressure of the fluid in the second path. Presumably, the Office Action intended to assert that the control port would allow regulation of fluid flow in the first path dependent on the pressure of fluid in the third path. With regard to independent method claims 18, 24 and 32, it was asserted that the device of Terpigorjev as modified by Yonnet would inherently perform all the steps and methods of the claims.

However, like Terpigorjev, Yonnet does not describe controlling the ratio of the mass flow rate of the liquid extinguishing agent to the mass flow rate of the pressurized gas to produce a constant droplet size distribution in and for substantially the duration of the discharge. Yonnet does not describe, teach or suggest that the disclosed pilot valve is used or is capable of being used to control the M_w/M_g ratio to maintain a constant droplet size during discharge of a two-phase mixture

of a liquid and a gas. Therefore, it would not have been obvious to one having ordinary skill in the art to combine Terpigorjev and Yonnet to make or use a fire and explosion suppression system having means in the first path for automatically adjusting the mass flow rate of the liquid extinguishing agent as a function of the applied pressure of the pressurized gas so as to control the ratio of the mass flow rate of the liquid extinguishing agent in the first path to the mass flow rate of the pressurized gas in the second path towards such a value as to tend to produce a constant droplet size distribution in and for substantially the duration of the discharge as required by claim 4. Likewise, it would not have been obvious to one having ordinary skill in the art to combine Terpigorjev and Yonnet to make or use a fire and explosion suppression system having control means for controlling the ratio of the mass flow rate of the liquid extinguishing agent in the first path to the mass flow rate of the pressurised gas in the second path towards such a value as to tend to produce a constant droplet size distribution in and for substantially the duration of the discharge, wherein the control means includes controllable valve means in the first path for automatically adjusting the mass flow rate of the liquid extinguishing agent in the first path as a function of the pressure of the pressurised gas in the third path during the discharge as required by claim 5. For the same reasons, it would not have been obvious to one having ordinary skill to combine Terpigorjev and Yonnet to practice the methods of claims 18, 24 and 32.

Additionally, "rejections on obviousness cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness." *KSR Int'l Co. v. Teleflex Inc.*, 127 S.Ct. 1727, 1741 (2007), quoting *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006). The Office Action must "identify a reason that would have prompted a person of ordinary skill in the art in the relevant field to combine the elements *in the way the claimed new invention does*." *Id* (emphasis added). In the Office Action, it was stated that the modification of Terpigorjev with the valve of Yonnet "would allow for the flow of the fluid in the first path to be dependent on the pressure of the fluid in the second path, as taught by Yonnet." However, this statement is conclusory, and does not provide a rational, articulated reasoning for why a person of ordinary skill in the art would have been motivated in the first place to combine the valve of Yonnet with the device of Terpigorjev in the way the claimed invention does.

The claimed invention requires controlling the ratio of the mass flow rate of the liquid extinguishing agent in the first path to the mass flow rate of the pressurized gas in the second path *towards such a value as to tend to produce a constant droplet size distribution in and for substantially the duration of the discharge*. Although Yonnet teaches a valve controlled by gas pressure, this alone does not provide an articulated reasoning of why a person having ordinary skill in the art would have been motivated in the first place to use the valve of Yonnet in the device of Terpigorjev *in the manner claimed.*

Furthermore, one having ordinary skill in the art would not have been motivated to put the variable orifice pressure-controlled valve of Yonnet into the apparatus of Terpigorjev. The apparatus and method described by Terpigorjev is used to provide a gas/liquid jet having finely atomized liquid droplets. Terpigorjev uses an acoustic field to produce the finely atomized liquid droplets. Terpigorjev does not describe, teach or suggest that a constant droplet size distribution is needed for substantially the duration of discharge. Additionally, other means (acoustic energy) are used to produce the finely atomized liquid droplets. Thus, one having ordinary skill in the art would not have combined Terpigorjev with Yonnet's variable orifice pressure-controlled valve in order to control the ratio of the mass flow rate of the liquid extinguishing agent in the first path to the mass flow rate of the pressurized gas in the second path towards such a value as to tend to produce a constant droplet size distribution in and for substantially the duration of the discharge. Terpigorjev does not teach and is not concerned with maintaining a constant liquid droplet size suspended in a stream of gas. Consequently, there is no reason why one of ordinary skill in the art would have been motivated to modify the apparatus of Terpigorjev with the valve of Yonnet in the manner claimed for controlling the ratio of a mass flow rate of a liquid extinguishing agent in a first path to a mass flow rate of a pressurized gas in a second path towards such a value as to tend to produce a *constant droplet size distribution* in and for substantially the duration of discharge.

In that independent claims 4, 5, 12, 18, 24 and 32 are in condition for allowance, the rejections to claims 3, 7, 9, 13, 14, 23-26, 30, 31 and 33, which depend therefrom, should be withdrawn and claims 3-5, 7, 9, 12-14, 18, 24-26 and 30-33 allowed.

Withdrawn Claims

Claims 6, 8, 10 and 11 were withdrawn from consideration as being drawn to nonelected species. With these amendments, generic independent claim 5 is allowable. Because claim 5 is allowable, withdrawn claims 6, 8, 10 and 11 are also allowable. Thus, Applicant respectfully requests examination and consideration of claims 6, 8, 10 and 11.

Conclusion

In view of the foregoing, it is respectfully submitted that claims 3-14, 18, 24-26, and 30-33 are in condition for allowance. Notice to that effect is respectfully requested.

The Commissioner is hereby authorized to charge any additional fees which may be required under 37 C.F.R. 1.16 and 1.17, or credit any overpayment, to Deposit Account No. 11-0982.

Respectfully submitted,

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